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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/542,440	07/15/2005	Yaoqiang Chen	3410-0107PUS1	2776

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EXAMINER	
DOUGHERTY, THOMAS M	
ART UNIT	PAPER NUMBER
2834	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	01/24/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 01/24/2007.

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mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/542,440	CHEN ET AL.	
	Examiner	Art Unit	
	Thomas M. Dougherty	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 July 2005* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *705*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Allowable Subject Matter

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 5, 6 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Nagano et al. (JP 09-116205). Nagano et al. show (fig. 4) a non-symmetric drive type piezoelectric ceramic transformer (see SOLUTION) comprised of a rectangular piezoelectric conductor, characterized in that said rectangular piezoelectric conductor is divided into three zones (d2, between electrodes 14 and 16, d1) along its length: the first zone (d2), called as oscillation node adjustment zone, the length of which is adjustable, so as to adjust (note in SOLUTION that distances d1 and d2 may be increased and by inference, decreased) the resonance frequency and oscillation node of said piezoelectric transformer; the second zone, called as input drive zone (between electrodes 14 and 16), the upper and lower surface of which is coated with electrode (14, 16) respectively, and which is polarized along its thickness; the third zone, called as output generation zone (d2), the output head of which is coated with electrode (18) and which is polarized along its length. Note that although this reference does not specifically show the polarities, it is a Rosen-type piezoelectric transformer. Rosen-type piezoelectric transformers have the same polarities as that claimed by the Applicants.

Said piezoelectric conductor is of single-layer. Note there are no internal electrodes.

As noted, the polarization direction of Rosen-type piezoelectric transformers of said input drive zone is from top to bottom or from bottom to top.

As noted the polarization direction of Rosen-type piezoelectric transformers of said output generation zones is right or left along its length.

As noted the polarization direction of Rosen-type piezoelectric transformers of said output generation zones is right or left along its length.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 2 rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Nagano et al. (JP 09-116205) in view of Asada et al. (JP 09-83032). Given the invention of Nagano et al. as noted above they don't discuss vibration modes.

Asada et al. show (figs. 4-6) a non-symmetric drive type piezoelectric ceramic transformer comprised of a rectangular piezoelectric conductor, characterized in that said rectangular piezoelectric conductor is divided into at least three zones (A-D) along its length: the resonance frequency and oscillation node of said piezoelectric transformer; the second zone, called as input drive zone (between electrodes 2a and

2b), the upper and lower surface of which is coated with electrode (2a, 2b) respectively, and which is polarized (P_1) along its thickness; the third zone, called as output generation zone (C and D), the output head of which is coated with electrode (3a, 3b) and which is polarized (P_2) along its length.

Asada et al. show two alternative oscillation modes, i.e., $\lambda/2$, λ, $3\lambda/2$, of which oscillation mode $\lambda/2$ has preferred output power and boosting ratio, when operating under oscillation mode $\lambda/2$, see figure 6, the null displacement oscillation nodes {*sic*} are located at the center of the transformer, the oscillating displacement of output head is greater than that of input head, and the oscillating displacement diagram belongs to an non-symmetric type diagram.

Asada et al. don't show a first zone the length of which is adjustable, though it may be in construction. Asada et al. don't specifically show a $3\lambda/2$ mode.

It would have been obvious to one having ordinary skill in the art to employ the vibration modes of Asada et al. in the device of Nagano et al. at the time of their invention since, as noted by Nagano et al., mechanical strength can be maintained.

Additionally, it is well within the abilities of one of ordinary skill in the art to select a mode with which to drive a structure such as Nagano et al's, and as this is a method of driving the device it is thus a method of using the device. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

Claims 4, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagano et al. (JP 09-116205) in view of Dai et al. (US 5,892,318). Given the invention of Nagano et al. as noted above, they do not show their piezoelectric conductor as being composed of several simple-layer piezoelectric conductor[s] which are added together and passing through monolithic process so as to form a multi-layer transformer.

Dai et al. show (figs. 1A, 1B) show their piezoelectric conductor as being composed of several simple-layer piezoelectric conductor[s] which are added together and passing through monolithic process (see col. 1, lines 31-36) so as to form a multi-layer transformer (left side of device).

The polarization direction of said input drive zone (106) is from top to bottom or from bottom to top. See figure 1B.

The polarization direction of said output generation zones {*sic*} (108) is right or left along its length.

It would have been obvious to one having ordinary skill in the art to employ several simple-layer piezoelectric conductors which are added together and passing through monolithic process so as to form a multi-layer transformer such as is shown by Dai et al. in the device of Nagano et al. at the time of the invention of Nagano et al. in order to since such a design is capable of generating high voltage as noted by Dai et al. in the first paragraph of their BACKGROUND OF THE INVENTION.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Jacobson (US 6,291,925) shows (fig. 1A) a Rosen-type piezoelectric transformer (see ABSTRACT) with typical polarization directions (P_P and P_S). Kawasaki et al. (US 6,084,336) show (figs. 1 and 5) two different configurations that have different lengths for a first zone according to the understanding of that zone from the Applicants. Kawasaki et al. also show a variety of driving modes. Both Okamoto et al. (JP 09-92901) and Kumasaka et al. (JP 08-191161) show a variety of vibration modes with their respective piezoelectric transformers.

Direct inquiry to Examiner Dougherty at (571) 272-2022.

tmd

January 1, 2007

Thomas M. Dougherty
TOM DOUGHERTY
PRIMARY EXAMINER